

WHAT IS CLAIMED IS:

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1. A multibeam scanning optical apparatus
comprising:

5 a light source having a plurality of light beam
emitting sections;

a light deflector for deflecting a plurality of
light beams emitted respectively from said plurality of
light beam emitting sections of said light source;

10 a scanning optical system for focussing said
plurality of light beams deflected by said light
deflector on a surface to be scanned; and

15 a photodetector for controlling the timing of the
start of scanning of said plurality of light beams by
detecting a part of at least one of said plurality of
light beams deflected by said light deflector as
detection light beam;

20 said timing of the start of scanning being so
controlled as to make the centers of the scanning areas
of said light beams agree with each other on the
surface to be scanned when said plurality of light
beams have respective wavelengths that are different
from each other.

2. A multibeam scanning optical apparatus
25 according to claim 1, further comprising:

a detection optical element for converging said
detection light beam and leading it to said

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photodetector;

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said detection optical element comprises an anamorphic lens.

4. A multibeam scanning optical apparatus according to claim 2, wherein

said detection optical element is made of a plastic material.

said scanning optical system comprises a
refraction optical element and a diffraction optical
element.

6. A multibeam scanning optical apparatus according to claim 5, wherein

said refraction optical element and said diffraction optical element are made of a plastic material.

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7. A multibeam scanning optical apparatus
according to claim 6, wherein

5 said detection optical element and said refraction
optical element are integrally formed by using a
plastic material.

8. A multibeam scanning optical apparatus
according to claim 2, further comprising:

10 an incident optical system for leading a plurality
of light beams emitted from said light source to said
optical deflector.

9. A multibeam scanning optical apparatus
according to claim 8, wherein

15 said incident optical system comprises a first
lens for collimating each of said plurality of light
beams emitted from said light source and a second lens
for focussing each of said plurality of collimated
light beams on the deflection plane of the optical
20 deflector as a linear image extending in the main-
scanning direction.

10. A multibeam scanning optical apparatus
according to claim 9, wherein

25 said detection optical element and said second
lens are integrally formed by using a plastic material.

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11. A multibeam scanning optical apparatus according to claim 1, wherein

5 said photodetector detects part of each of a plurality of light beams deflected by said optical deflector and controls the timing of the start of scanning of each of said plurality of light beams.

12. A multibeam scanning optical apparatus comprising:

10 a light source having a plurality of light beam emitting sections;

a light deflector for deflecting a plurality of light beams emitted respectively from said plurality of light beam emitting sections of said light source;

15 a scanning optical system for focussing said plurality of light beams deflected by said light deflector on a surface to be scanned;

a photodetector for controlling the timing of the start of scanning of said plurality of light beams by detecting a part of at least one of said plurality of light beams deflected by said light deflector as detection light beam; and

20 a detection optical element for converging said detection light beam and leading it to said photodetector;

25 said detection optical element having its optical plane arranged orthogonally relative to said detection

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light beam.

13. A multibeam scanning optical apparatus
according to claim 12, wherein

5 said detection optical element comprises an
anamorphic lens.

14. A multibeam scanning optical apparatus
according to claim 12, wherein

10 said detection optical element is made of a
plastic material.

15. A multibeam scanning optical apparatus
according to claim 12, wherein

15 said scanning optical system comprises a
refraction optical element and a diffraction optical
element.

16. A multibeam scanning optical apparatus
20 according to claim 15, wherein

 said refraction optical element and said
diffraction optical element are made of a plastic
material.

25 17. A multibeam scanning optical apparatus
according to claim 16, wherein

 said detection optical element and said refraction

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optical element are integrally formed by using a plastic material.

18. A multibeam scanning optical apparatus
5 according to claim 12, further comprising:

an incident optical system for leading a plurality of light beams emitted from said light source to said optical deflector.

10 19. A color image forming apparatus comprising:

15 a plurality of scanning optical apparatus, each
having a light source, a light deflector for deflecting
a light beam emitted from said source, a scanning
optical system for focussing the light beam deflected
by said light deflector on a surface to be scanned and
a photodetector for controlling the timing of the start
of scanning of said light beam by detecting a part of
said light beam deflected by said light deflector as
detection light beam, said photodetector and the center
20 of the scanning width in the main-scanning direction on
the surface to be scanned being held optically
equivalent; and

25 a plurality of image carriers arranged
respectively on the surfaces to be scanned of said
scanning optical apparatus for forming images with
respective different colors.

20. A color image forming apparatus according to claim 19, wherein

each of said scanning optical apparatus further comprises:

5 a detection optical element for converging said detection light beam and leading it to said photodetector;

10 said detection optical element having its optical plane arranged orthogonally relative to the detection light beam.

21. A color image forming apparatus according to claim 20, wherein

15 said detection optical element of each of said scanning optical apparatus comprises an anamorphic lens.

22. A color image forming apparatus according to claim 20, wherein

20 said detection optical element of each of said scanning optical apparatus is made of a plastic material.

23. A color image forming apparatus according to claim 20, wherein

25 said scanning optical system of each of said scanning optical apparatus comprises a refraction

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optical element and a diffraction optical element.

24. A color image forming apparatus according to claim 23, wherein

5 said refraction optical element and said
diffraction optical element of each of said scanning
optical apparatus are made of a plastic material.

25. A color image forming apparatus according to
10 claim 24, wherein

said detection optical element and said refraction optical element of each of said scanning optical apparatus are integrally formed by using a plastic material.

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26. A color image forming apparatus according to claim 20, wherein

each of said scanning optical apparatus further comprises:

20 an incident optical system for leading the light
beam emitted from said light source to said optical
deflector.

27. A color image forming apparatus according to
25 claim 26, wherein

said incident optical system of each of said scanning optical apparatus comprises a first lens for

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collimating the light beam emitted from said light source and a second lens for focussing the collimated light beam on the deflection plane of the optical deflector as a linear image extending in the main-scanning direction.

28. A color image forming apparatus according to claim 27, wherein

said detection optical element and said second lens of each of said scanning optical apparatus are integrally formed by using a plastic material.

29. A color image forming apparatus according to claim 19, wherein

said light source of each of said scanning optical apparatus comprises a plurality of light emitting sections for emitting a plurality of light beams modulated independently relative to each other.

30. A color image forming apparatus comprising:
a plurality of scanning optical apparatus, each having a light source, a light deflector for deflecting a light beam emitted from said source, a scanning optical system for focussing the light beam deflected by said light deflector on a surface to be scanned, a photodetector for controlling the timing of the start of scanning of said light beam by detecting a part of

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said light beam deflected by said light deflector as
detection light beam and a detection optical element
for converging said detection light beam and leading it
to said photodetector, said detecting optical element
5 having its optical plane arranged orthogonally relative
to said detection light beam; and

a plurality of image carriers arranged
respectively on the surfaces to be scanned of said
scanning optical apparatus for forming images with
10 respective different colors.

31. A color image forming apparatus according to
claim 30, wherein
said detection optical element of each of said
15 scanning optical apparatus comprises an anamorphic
lens.

32. A color image forming apparatus according to
claim 30, wherein
20 said detection optical element of each of said
scanning optical apparatus is made of a plastic
material.

33. A color image forming apparatus according to
25 claim 30, wherein
said scanning optical system of each of said
scanning optical apparatus comprises a refraction

collimating the light beam emitted from said light
source and a second lens for focussing the collimated
light beam on the deflection plane of the optical
deflector as a linear image extending in the main-
scanning direction.

38. A color image forming apparatus according to
claim 37, wherein

said detection optical element and said second
lens of each of said scanning optical apparatus are
integrally formed by using a plastic material.

39. A color image forming apparatus according to
claim 30, wherein

said light source of each of said scanning optical
apparatus comprises a plurality of light emitting
sections for emitting a plurality of light beams
modulated independently relative to each other.

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